

## Replacement Instructions

# hp StorageWorks MSA1000 Controller and Components

*These instructions apply to the MSA1000 product family. The part may also be used in other HP products. Please refer to documentation for your specific product for detailed replacement instructions.*



If the product in which this part is being replaced is still under HP warranty, then the replacement part(s) referred to in these Replacement Instructions is provided under the terms and conditions of the Hewlett-Packard Company Limited Warranty for that product. A copy of this Limited Warranty may be viewed at:

<http://h18006.www1.hp.com/products/storageworks/warranty.html>

If this is a trade sale part (product out of warranty), then the replacement part(s) referred to in these Replacement Instructions is provided under HP's express limited warranty statement, which may be viewed at:

[http://customerops.corp.hp.com/1sw/pdm.om/warranty\\_support/policies/2330100.doc](http://customerops.corp.hp.com/1sw/pdm.om/warranty_support/policies/2330100.doc)

The replacement part takes on either the Limited Warranty Period of the part being replaced or a ninety-day period that begins upon installation of the replacement part, whichever is greater.

The information contained on these replacement instructions is subject to change without notice. The only warranty for this replacement product is as noted above. Nothing in these replacement instructions should be construed as constituting an additional warranty. The information provided in these replacement instructions is provided "AS IS" and HP is not liable for technical or editorial errors or omissions contained herein.

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## About this document

This document details the procedures for replacing a failed controller or controller component in HP StorageWorks Modular Smart Array (MSA) storage systems.

## Before you begin

Read the following cautions and information before beginning removal and replacement procedures.



**Caution:** Be sure the replacement part is available before removing the failed component. Removing a component impacts cooling within the enclosure.



**Caution:** It is important to follow these instructions when replacing components in the MSA. If the procedure is done improperly, it is possible to lose data or damage equipment.



**Caution:** When handling the cache module, there is a danger to equipment from electrostatic discharge (ESD). Use proper anti-static protection at all times. To avoid damage to equipment use the following precautions when handling the cache module.

- Keep the cache module in the ESD bag until you need to handle it.
- Always wear an ESD wrist strap grounded to an unpainted surface of the chassis.
- If an ESD wrist strap is unavailable, touch an unpainted surface of the chassis before handling the module.
- Never touch the connector pins.

Refer to the documentation that shipped with your system for additional information.

**Note:** When replacing a controller cache module the memory size of the new module must be identical to the cache modules already installed in the unit.

## Battery replacement notice

Your MSA1000 is provided with Nickel Metal Hydride batteries. There is a danger of explosion and risk of personal injury if the array is incorrectly replaced or mistreated. Replace only with the HP spare designated for this product. For more information about battery replacement or proper disposal, contact your HP Authorized Reseller or your Authorized Service Provider.



**WARNING:** Your Accelerator Array contains Nickel Metal Hydride batteries. There is risk of fire and burns if the battery pack is not handled properly. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose to temperatures higher than 60° C.
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace only with HP spare designated for this product.



**Caution:** Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. In order to forward them to recycling or proper disposal, please use the public collection system or return them to HP, your authorized HP Partners, or their agents.

## Controller access

Before removing a controller it is important to stop all system access (for example: application, system I/O or RAW device file path/s) to the device.

## System power down requirements

- If you are replacing the controller cache on a *single controller system*, power down the system first.
- If you are replacing the controller cache on a *two-controller system* with another module of the *same cache memory size*, the system can remain powered on.
- If you are replacing the controller cache on a *two-controller system* with another module having a *different cache memory size*, power down the system and change the module on both controllers at the same time.

## Document usage

Your component replacement may not require all steps listed in this document.

- **Controller replacement only:** Use steps 1 and 5
- **Controller cache module replacement** (no battery replacement): Use steps 1, 2, 4, and 5.
- **Controller cache batteries replacement:** Use steps 1 through 5.

## Verifying component failure

Before replacing the controller, cache module, or batteries, use the following methods to verify the component failure.

- Check the controller fault LED (Figure 1, ②). If the LED is on, it may indicate a failure. Check the LCD for one of the error messages listed in Table 1.

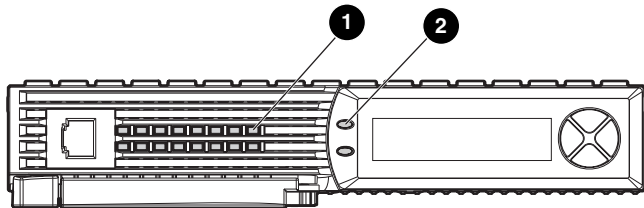


Figure 1: Controller indicators

Table 1: LCD Error Messages

No.	Message
03	CRITICAL LOCK-UP DETECTED. CODE=<n>h
50	REDUNDANCY FAILED OUT OF MEMORY
51	REDUNDANCY FAILED I/O REQUEST ERROR
52	REDUNDANCY FAILED PCI BUS ERROR
53	REDUNDANCY FAILED NO SECOND CONTROLLER

Table 1: LCD Error Messages

No.	Message
54	REDUNDANCY FAILED CACHE DIMMS MISMATCH
60	NO CACHE MODULE FOUND
66	CACHE HARDWARE FAILED AND DISABLED
73	CACHE HARDWARE BATTERIES MISSING
204	ARRAY CONTROLLER DISABLED
305	ROM CLONING FAILED
308	FIRMWARE FLASH FAILED
501	PCI SUBSYSTEM HARDWARE FAILURE
502	PCI BRIDGE ASIC SELF TEST FAILURE
513	UNCORRECTED ECC MEMORY ERROR SEEN
514	FIBRE SWITCH HARDWARE FAILURE
515	FIBRE DEVICE HARDWARE FAILURE
516	FIBRE SUBSYSTEM LINK FAILURE

- Remove the controller, wait 10 seconds, and then reinsert it ensuring that it is fully seated in the chassis. If this does not resolve the issue, continue with the replacement procedures.
- Check the controller idle heartbeat LED (Figure 1, ①). If the LED is off or solid (not blinking), it indicates a failure.

## Step 1

### Removing the controller

1. Press the thumb latch and rotate the latch handle out ①.
2. Pull the controller straight out of the chassis ②.

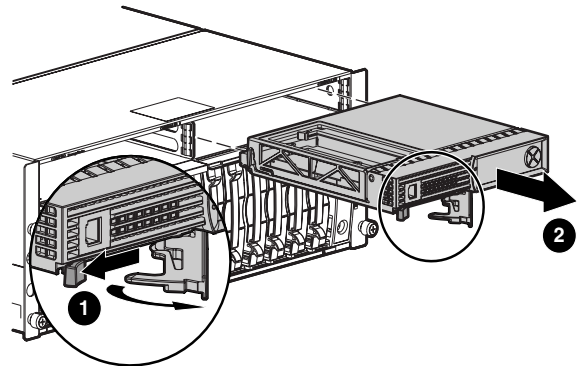


Figure 2: Removing the controller

## Step 2 (if applicable)

### Removing the controller cache module

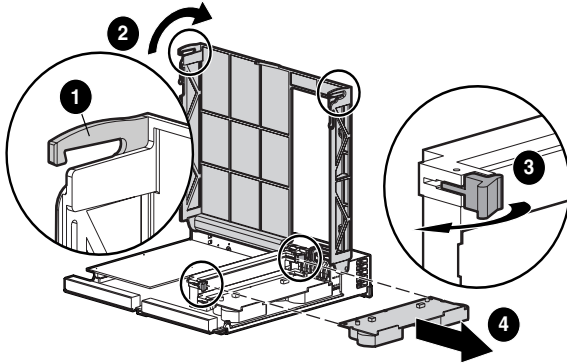
**Note:** Replacement controllers include a new cache module. Remove this new module from the replacement controller and replace it with the cache module from the failed controller. Using the same cache module completes the disk writes that may have been trapped in the controller's cache.

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**Note:** The controller in [Figure 3](#) has been rotated to show the side and rear of the controller.

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1. Locate the controller cover clips **1** on the rear, lower left and right sides of the module by holding the controller upright with the latch handle facing you.
2. Unlatch the controller cover clips **1** on the rear of the controller and raise the cover **2**. See [Figure 3](#).
3. Simultaneously unlatch the clips that are holding the cache module in place **3**.
4. Carefully pull the cache module away from the controller board **4**.



**Figure 3: Removing the cache module**

### Step 3 (if applicable) Removing the controller cache batteries

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**Note:** If you are not replacing the controller cache batteries, proceed to Step 4.

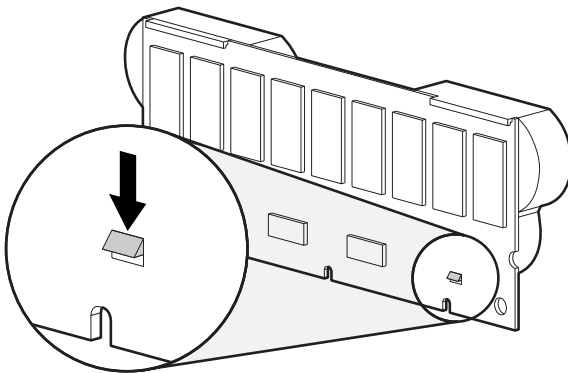
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**Note:** Batteries should always be replaced in pairs, not individually.

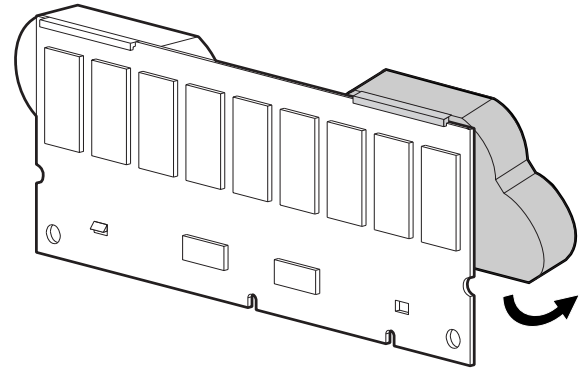
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1. Push down on the bottom clip of the battery, attached near the lower corner of the module. See [Figure 4](#).



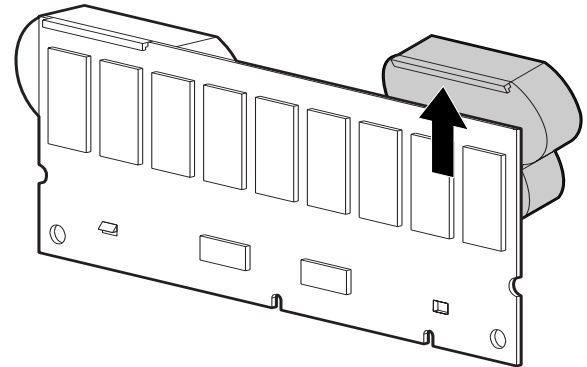
**Figure 4: Bottom clip on battery**

2. Swing the battery away from the module to about a 30-degree angle. See [Figure 5](#).



**Figure 5: Angling the battery**

3. Lift the battery upward to unhook the top of it. See [Figure 6](#).



**Figure 6: Removing the battery**

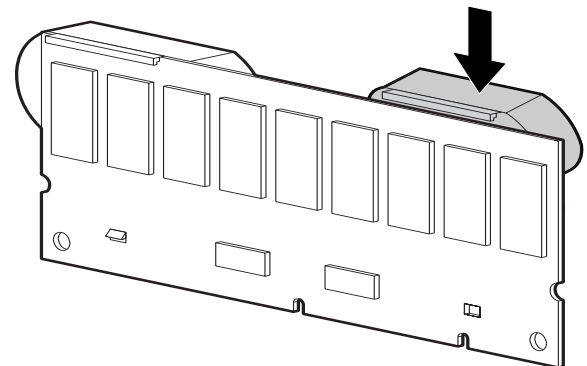
4. *Wait about 15 seconds* after removing the old battery to allow the battery charge monitor to reset.

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**Note:** If you do not wait the 15 seconds after removing the old battery, full charge of the new cache battery is delayed.

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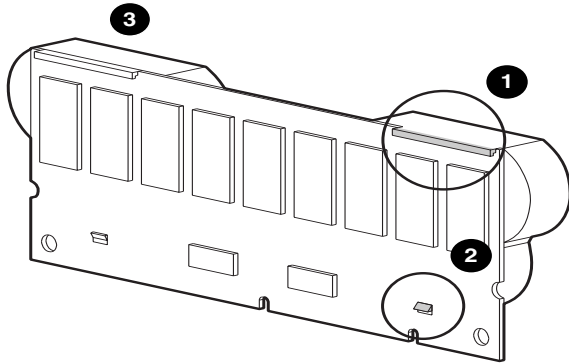
5. Repeat [step 1](#) through [step 4](#) for the second battery.
6. Hook the top of the new NiMH battery to the top of the module with the battery held at a 30-degree angle to the plane of the module. See [Figure 7](#).



**Figure 7: Installing the battery**

7. Swing the battery downward making sure the bottom clip and two pegs line up with the holes in the module.

8. Make sure that the top hook **1** and bottom clip **2** on the battery are securely attached to the module. See [Figure 8](#).



**Figure 8: Securing the battery**

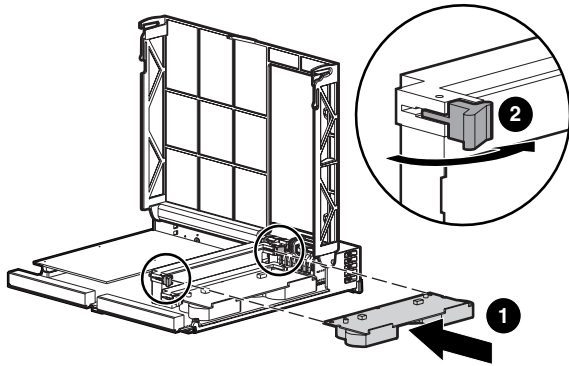
9. Repeat [step 6](#) through [step 8](#) for the second battery **3**.

**Note:** The cache is disabled while the batteries are charging. Cache is re-enabled after the batteries are fully charged.

## Step 4 (if applicable) Installing the controller cache module

**Note:** When only one cache module is installed, the module should be installed in the bottom slot.

1. Slide the module into the controller **1**. Be sure the side latches are fully engaged **2**. See [Figure 9](#).

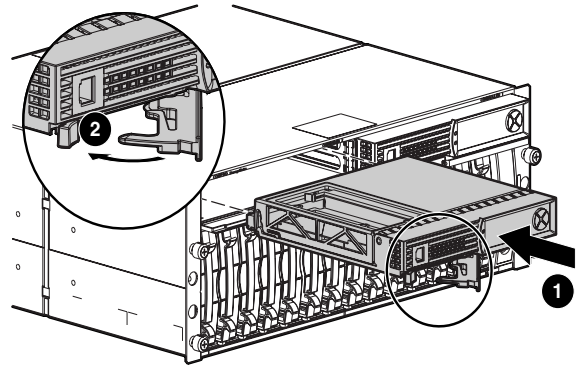


**Figure 9: Installing the module**

2. Close the controller cover.

## Step 5 Installing the controller

1. Insert the replacement controller into the chassis **1**. See [Figure 10](#).



**Figure 10: Installing the controller**

2. Push the controller in as far as it will go; press the latch inward until it is flush against the front panel **2**.

Installation is complete.

## Firmware

When replacing a controller module in a dual controller configuration, you may receive the following LCD message if the firmware versions are mismatched:

07. Clone Firmware? '<' = NO, '>' = YES

To select YES, press the left navigation button on the controller. To select NO press the right navigation button. HP recommends selecting **Yes** to accept the default and clone the current firmware. If **No** is selected, the controller is disabled and the storage system continues to run in a non-redundant mode.

When replacing a single controller, verify the firmware version, and if necessary upgrade the controller firmware by going to <http://www.hp.com/go/storage> and access the appropriate web page for your model.

## Verifying the replacement

After replacing the failed controller or component:

- Check the controller idle heartbeat LED (Figure 1, **1**) to be sure the LED is on or blinking.
- Check the controller fault LED (Figure 1, **2**) to be sure the LED is off. Unread error log messages may cause the LED to remain lit. Be sure all error messages that have been responded to are deleted.
- No new error messages should be displayed on the LCD.

## Returning the failed component

Please follow the return instructions provided in the new component package.

## Additional information

For additional information, error codes, and troubleshooting tips, refer to the *HP StorageWorks MSA1000 Controller User Guide* and the MSA technical documents web site at <http://www.hp.com/go/msa1000>.